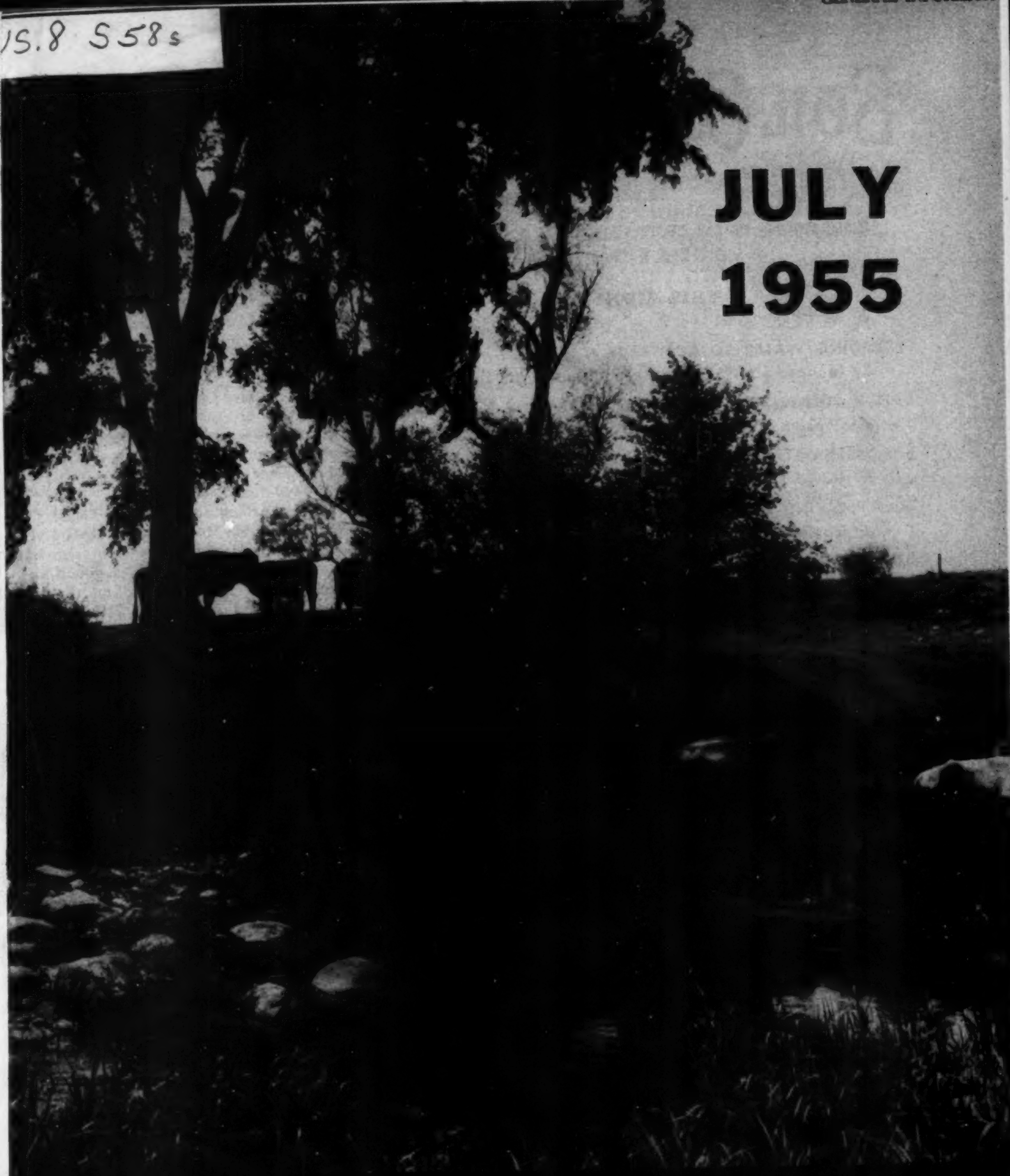

JULY 1955

SOIL CONSERVATION

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EZRA TAFT BENSON
SECRETARY OF AGRICULTURE

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ADMINISTRATOR, SOIL CONSERVATION SERVICE

OFFICIAL ORGAN OF THE SOIL CONSERVATION SERVICE, U. S. DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

OUR SOIL ★ OUR STRENGTH

★ THIS MONTH ★

WELLINGTON BRINK
Editor

SOIL CONSERVATION is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication has been approved by the Bureau of the Budget, July 29, 1954. SOIL CONSERVATION supplies information for workers of the Department of Agriculture and others engaged in soil conservation.

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SIMPLE TEST. — George Griffin of Hodgdon, Maine had heard a lot about soil erosion, so he decided to find out for himself what was happening to the soil on his farm.

He crumbled two pages of a mail order catalogue into wads and placed them in adjacent rows at the top of a moderately sloping potato field with rows up and down slope. A 40-minute, half-inch rain followed immediately.

After a long search Griffin found the paper wads in woods 30 feet beyond the edge of the field and 100 rods from the spot he had placed them. The runoff had deposited 2 inches of soil on the sod headland. In the woods Griffin found more than a foot of topsoil carried down by previous runoff.

Griffin at once applied to the supervisors of the Southern Aroostook Soil Conservation District for assistance. A Soil Conservation Service technician helped plan and install a stripcropping system. Soil losses now are at a minimum, and estimated yields are up by at least 15 percent.

—JOHN W. HART

FRONT COVER. — Contented Brown Swiss cows on pasture in Fond du Lac County, Wis., where there is plenty of good grass, pure running water, and shade.

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Spreading Water to Conserve It

Science is tackling the complicated problem of underground water storage. Little by little, the methodical research being conducted by cooperating agencies and institutions is getting at the challenge of underground reservoirs waiting to be filled. This is an authoritative article on a matter of importance to the agricultural future of millions of arid and semiarid acres.

By LEONARD SCHIFF, ELDRED S. BLISS and CURTIS E. JOHNSON

No. 5

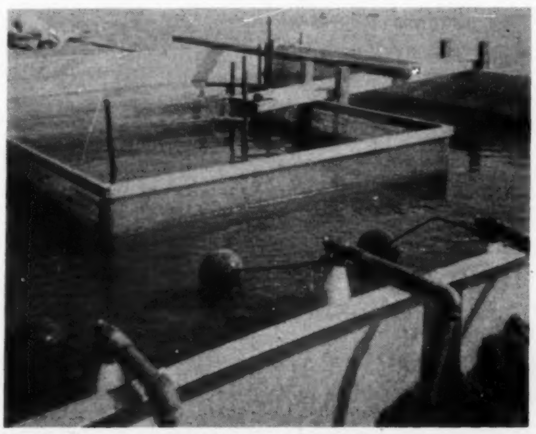
This is the fifth of a series of articles to appear from time to time in explanation of the various phases of research being conducted by the Department of Agriculture on problems of soil and water conservation.

WATER conservation and soil conservation go hand in hand. Measures like contour cultivation, basin listing, stripcropping, and terracing conserve the water as well as the soil. However, such conservation of water is inadequate for replenishing ground water where pumping exceeds natural replenishment.

Where natural replenishment is inadequate, wells have dried up and farms have been abandoned. In other areas wells have had to be deepened until pumping costs consume much of each year's profits. In the San Joaquin Valley, Calif., where the investigations reported herein are being conducted by the western soil and water management section, soil and water conservation research branch, Agricultural Research Service, average pumping lifts have increased from about 20 feet to 10 times that depth in a 40-year period. Farmers on millions of acres of arid and semiarid land depend on pumping as their only possible source of water for crops. In humid areas more farmers are depending upon supplemental supplies for irrigation by pumping to carry them through drought periods. Agricultural, industrial, and domestic demands are depleting ground water supplies at an alarming rate.

The conservation of water by storage is frequently thought of as a surface job. Yet, beneath the surface of the ground there are subsurface basins with unused storage far in excess of the largest surface reservoirs. In many localities surface reservoirs have been constructed on the usable sites. This does not imply subsurface storage basins and surface reservoirs are in competition, oftentimes they supplement each other. It does mean that the subsurface storage basin has been neglected, and has potential because of its unused capacity, availability, and low evaporation loss. Water in excess of carefully planned irrigation use, floodwaters, waste waters, and water saved by avoiding excessive evapotranspiration can be stored in these subsurface basins. Additional

Note.—The authors are, respectively, research project leader, soil scientist, and soil microbioligist, western soil and water management section, soil and water conservation research branch, Agricultural Research Service, Bakerfield, Calif.



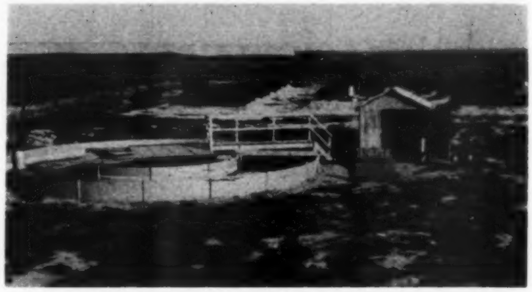
Projecting screen attached to sand filter over gravel-filled shaft in operating pond. The protruding pipes are piezometers.

water from other areas where natural excesses exist or are produced by conservation may be conveyed to areas with depleted ground water. Most of the excess water will be available in wet years. Frequently water is available for storage when irrigation demands are low and the irrigation system or additional systems may be used to convey water to spreading sites. Available water may be diverted over subsurface basins to infiltrate through the soil and percolate downward to the ground water table. This is known as water spreading. Another form of water spreading is to inject water beneath the ground through wells, pits, and shafts.

The October 1949 issue of SOIL CONSERVATION Magazine contained two articles on water spreading. A. T. Mitchelson described the methods of spreading water on previous soils with subsurface conditions that would permit rapid flow to the ground water table. His article discussed methods of spreading water on the surface, the use of protected diversions, revetments, and dike controls, and the bypassing of silt-laden waters. But in many areas where replenishment is required, soils are not very pervious. Glenn K. Rule, of the Soil Conservation Service, utilizing data supplied by Mitchelson, wrote about experimental work to make water move more rapidly into the less pervious soils. Such an accomplishment would reduce the amount of valuable land needed for spreading and would localize water where desired. He described how the rate at which water entered the soil on small test ponds was increased from a maximum of 3.6 feet per day to 14 feet per day by treating the soil with cotton gin trash. Benefits had lasted 3½ years at the time he wrote.

At the time of Rule's article the experimental work was a cooperative project by the Soil Conservation Service, the Kern County Land Company, the Bureau of Reclamation, and the California State Division of Water Resources. These same agencies are still interested or active in this work, and they have been joined by the University of California Agricultural Experiment Station and the United States Agricultural Research Service.

This cooperative research deals with fundamentals of how and why water moves through soil under long submergence, what are the



Chlorinating water supply of ring test pond.

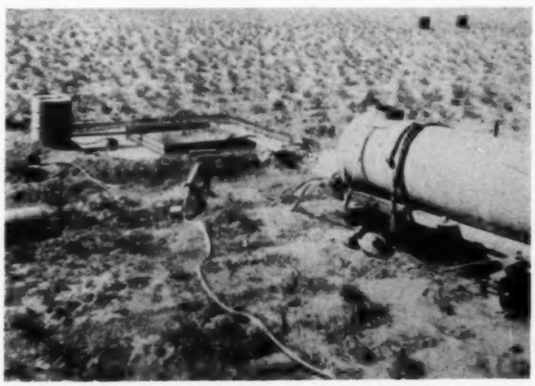
forces that influence this movement, and what can be changed to increase the rate at which water enters the soil. This entry rate is called the infiltration rate. Treatments designed to enlarge soil pores, develop stable soil aggregates, or open less pervious subsurface layers are being studied. A major problem is clogging of the soil pores after water spreading is underway. Studies show that clogging can be caused by movement, slaking, swelling, or settling of soil particles, or by microbial activity. It is important to find treatments that overcome this clogging, and thus permit high infiltration rates to continue over spreading periods of several months. In this connection, more work has been done on the cotton-gin-trash treatment mentioned earlier. Recent computations show infiltration-rate averages for a 200-day period were 1.0 foot per day on an untreated test pond and 5.8 feet per day for a cotton-gin-trash treated test pond.

Now, let us see why this treatment works and what other treatments are being tested. Test ponds treated with cotton gin trash several years ago produced high infiltration rates after the first or second run and still exhibit high rates when they are appropriately dried between runs. During the first and usually the second runs, cotton gin trash is decomposed by microorganisms. These microorganisms produce gases, liquids, and solids which clog the soil and reduce infiltration rates. But upon drying, these secretions bind the small particles of soil together into rather stable crumbs or aggregates. This wetting and drying has been called "incubation." Incubation also develops larger, more stable pores through which water can readily move. And because the pores are larger and more stable, clogging is more difficult. Thus, high infiltration rates last longer.

Studies show that cotton gin trash does better than barley straw, alfalfa, rice hulls, and some other organic residues which have a somewhat similar effect. So far, cotton gin trash appears to be best for the San Joaquin Valley because of its decomposition rate, decomposition products, and rather lasting benefits. Also, it is a waste product free for the hauling. There is, however, the cost of hauling, distribution, and incorporation in the soil. Other organic residues may be more readily available and beneficial elsewhere.

During early experimental work benefits from growing grasses were described as good but less beneficial than cotton gin trash. Continued experiments have shown that it takes a few years to establish a good stand of grass. Well-established bermudagrass on a small test pond has produced infiltration rates similar to well-decomposed cotton gin trash. The vigorous growth of roots and the active decomposition of various plant parts produce soil conditions favorable for infiltration. This grass can stand severe droughts and partial submergence. Different grasses may be suitable in other places. Grasses on large spreading areas may also provide hay or a forage crop, a very important consideration.

What about the use of some of the new soil conditioners? Laboratory studies showed that some conditioners increased the rates at which water moved through tubes packed with several different soils and maintained rates much higher than untreated tubes for 6 months or longer. The next step was to check conditioners in the field. One kind of conditioner (known as vinyl acetate maleic acid type) increased infiltration rates almost as much as cotton gin trash. A second kind, (ammonium lignin sulphonate and wood sugars) much less costly, approximately doubled the normal infiltration rate. A third type gave no improvement on a sandy loam but has been reported to be effective on heavy clays.



Infiltrometer for determining the infiltration rate.

The immediate benefits of soil conditioners seem to give them an advantage over vegetative treatments. This was a major reason for their trial. However, benefits produced by conditioners do not seem to last so long as those produced by vegetative treatments. On the third run of a test pond treated with a conditioner and supplied with clear water, infiltration rates declined to about one-half those in the first run. Observations in the field indicate that vegetative treatments can keep a soil more friable and open than soil conditioners when the water contains small amounts of silt or debris. Such factors as type of soil, cost of application, length of benefits, and needed infiltration rate must be considered, however, in deciding on the relative merits of any treatment. These will vary according to localities.

Chemical treatments such as gypsum, calcium chloride, detergents, and germicides have been tried with comparatively little success. Mechanical treatments such as removal of surface soil, breaking up surface crusts, and cultivation also have been only slightly beneficial. As more information is obtained on all the basic factors involved some of these treatments may well find a place. Combinations of treatments sometimes may be required. For example, a soil conditioner may help aggregate loose material developed during a ripping operation, or improve soil conditions while a grass is being established. Treatments may fail simply because they have been used improperly. For instance, soil conditioners require such a light rate of application that they have been difficult to distribute in a soil. Sometimes a treatment is expensive because 6 inches of a soil is treated; perhaps a 1-inch treatment would produce almost as much benefit. These are challenges to research.

It may be noticed that improvements mentioned so far have taken place in the laboratory or on small test ponds. What about large-scale treatments?

The development of a large spreading area

Clogging crust on injection trench curled on drying.

requires heavy machinery to level land and build dikes. This operation breaks down the original soil structure and compacts soil. On several recently constructed large spreading areas infiltration rates turned out to be too low for practical use, because the soil had been damaged by the heavy machinery. It appears that land should be leveled only to control the water. To help keep machinery off most of the spreading area, dikes can be built from cuts closely parallelling them.

Because cotton gin trash worked so well on small ponds, it was one of the first treatments tried on a large area. Gin trash is bulky and hard to handle, and a lot of it is needed to give results. After spreading, this material is disked into the soil surface to prevent floating and piling up by wind. Cotton gin trash incorporated at rates of 50 to 100 tons per acre on a newly developed spreading area did not appear to be effective. However, when these basins were ripped to relieve compaction, infiltration rates on some basins doubled and tripled to reach what is locally considered a "practical rate" of 1.5 feet per day.

The infiltration rate achieved with cotton gin trash on large areas was a far cry from the 14-foot rate on small test ponds. Why? We believe the limitation was due to a subsurface condition. Small pipes called piezometers were driven to various depths in the soil to help answer the question. These piezometers are open at the end so that water can enter at the bottom. They showed that perched water tables occurred on top of some less pervious stratified layers. Piezometers that ended in these less pervious layers showed no water. These subsurface layers, then, were retarding downward movement of water. Infiltrometers built out of 9-inch pipe were driven a few inches into the soil. Water was maintained on the soil surface in these infiltrometers. Infiltration rates were 4 or 5 feet per day. When the infiltrometer was driven down so that it was in contact with the hardpan, a rate of 0.6 foot per day was obtained. This rate approached the average infiltration rate of the large spreading area on this soil.

These less pervious layers do not reduce the infiltration rate of a small test pond because water building up on the less pervious layers beneath a small test pond flows away laterally. A large area may be considered to consist of a large number of small ponds. Flow beneath the inner ponds is held largely to vertical flow downward by the outer ponds.

An example of the effect of operational procedures and lateral flow on infiltration rates follows. Two one-half acre adjacent basins were constructed by building the dikes from the outside. On one basin a soil conditioner was incorporated to 3 inches in the surface soil by rototilling. The other basin was rototilled without conditioner. Light equipment was used. On the first run infiltration rates averaged 2 feet per day on each basin, as contrasted to about 0.5 foot per day on a surrounding large spreading area. When water was removed from the surrounding area, both one-half acre basins had an increased opportunity for lateral flow if subsurface layers were retarding infiltration. The conditioner-treated basin increased in infiltration rate, indicating a better surface condition than on the untreated basin. This also indicated that the flow was limited by less pervious subsurface layers.

What can be done about these less pervious subsurface layers? Ripping and extending shafts, trenches, pits, and wells through such layers are being tried. Thought has been given to leaching chemicals downward to act upon the less pervious layers. In the San Joaquin

Valley ripping has been tried on shallow hardpans and stratified layers. Preliminary results varied from little gain in some areas to almost doubling infiltration rates in others. These differences are now known to be due to discontinuities that occur in the limiting layer in some areas, or to the layers being too deep to reach with the ripper.

Where pervious sandy layers underlie less pervious soil, gravel-filled shafts 4 feet in diameter and 20 feet deep have been tried as a method of carrying down water. A projecting screen is attached to a sand and gravel filter over such a shaft. The maximum injection rate through one shaft was equal to the average infiltration rate on 1 acre of land nearby. However, the injection rate declined with time. Head loss measurements indicated that a drop in water pressure occurred across the surface of the coarse soil layers where they contacted the gravel in the shaft. Sand filters had been used to prevent material from entering the shaft. However one side of the shaft sloughed during the run and this material apparently caused much of the clogging.

Another possible clogging agent is bacterial activity. It may be desirable to restrict microbial activity by chlorination, as has been done in tests elsewhere. This is costly. The effect of chlorine on microbial activity and organic matter is being studied on another small test pond. If relatively cheap, satisfactory shafts can be developed it may be more economical to drill new ones occasionally than to use chlorine. This assumes that chlorine will be beneficial. Future research also considers the use of a backfilling material such as coarse sand which may stabilize the sides and filter out material at the surface. The surface of the filter may be removed when clogged and replaced.


Mixing a soil conditioner into soil of test pond.

Trenches and pits have been tested for recharge purposes. Satisfactory rates of 6 feet per day were obtained in a pit 10 feet deep contacting sand. A trench gave injection rates of about one-third those of the pit, due partially to surface clogging. Piezometer measurements showed high losses of head due to friction at the surface of the ditch. A few small portions of the trench treated with a soil conditioner appeared stable. Infiltration rates determined with infiltrometers were three times higher on the conditioner-treated portions than on the untreated portions.

To design a water spreading basin properly there is a need for information on both surface and subsurface conditions down to the water table. On large areas used for spreading, surface treatments should be limited to keep the water moving through the surface as fast as it can move through lower soil layers. If the natural surface intake rate is high enough but has been reduced by heavy machinery, surface treatment is costly. It may pay to allow the soil to recover to normal over a period of time by wetting and drying, natural vegetative growth and other factors. Manipulation of soil should be held to a minimum. Where the infiltration rate of the surface soil is appreciably below that of subsurface layers, major treatments to increase the rate through the surface may be fully justified. The capacity of the basin, the positions of limiting layers, and the length of time during which given quantities of water are available must be considered.

Further developments of operational procedures are necessary to apply treatments originating from the laboratory and small test pond. Systems of spreading are being studied. For example, if the rate of flow through the surface is considerably higher than the rate of flow through subsurface layers, spreading on relatively long narrow strips may allow as much water to enter the basin as would flooding the entire surface. Treatment could then be con-

fined to the strips. Farming or other land use might be possible between strips.

A rotational system in which some portions of the area are flooded while some are dried, warrants more investigation. Portions would be flooded only while infiltration rates remain high. These portions would be dried more frequently for recovery of infiltration rates.

Soil surveys and laboratory tests on the physical and chemical properties of the soil and water help to determine the suitability of a surface soil for absorbing water. Logs of wells, jetting exploratory holes into the soil, and cable tool test wells help determine subsurface conditions. The infiltrometer also is a worthwhile tool. Infiltrometers were used to determine both infiltration-rate curves for watersheds and for potential water spreading areas in the Tehachapi (Calif.) Soil Conservation District. This work is described by R. E. Ballard in SOIL CONSERVATION Magazine, December 1954. Investigations of runoff and spreading sites indicated the feasibility of spreading the runoff from some of the watersheds. A spreading ground has been built to conserve the water from one watershed as a result of these investigations.

Soil surveys and infiltrometer runs were used to determine suitability of conditions for spreading water on the proposed El Rio Spreading Ground in Ventura County, Calif. Good subsurface conditions, indicated by the few available well logs, were substantiated by some new cable tool test wells. Infiltrometer tests indicated that satisfactory recharge rates would exist under water spreading conditions. A check was provided by comparing infiltration rates obtained with infiltrometers installed on the nearby Saticoy Spreading Ground against infiltration rates obtained from actual spreading runs.

The El Rio Spreading Ground is now under construction by the United Water Conservation district and will be supplied with water diverted from the Santa Clara River.

The growing countrywide interest in ground water replenishment requires increased support of research in water spreading techniques. The writers gratefully acknowledge the extensive facilities and help made available by the Kern County Land Company and the North Kern Water Storage District, without which a number of the field experiments described here could not have been conducted.

Rain is Slim but Cattle are Fat

This is the story of a quick response by grass and beef to the management genius of young Bob Sprowls. Conservation ranching enables him to make money and to have a part in the program of upstream flood control.

By CHESTER F. FRY

INCREASING beef production 5,440 pounds per year while at the same time reducing his cow herd from 168 to 100 animals is the significant achievement of young Bob Sprowls, conservation rancher, who operates a spread near Elk City, Okla. Sprowls took over the management of the ranch after graduation from Oklahoma Agricultural and Mechanical College in 1951.

The ranch consisted of one pasture of 2,520 acres with 168 head of commercial beef cows and about 50 head of yearlings. The yearlings were sold in the fall of '51. The next year Bob raised 73 calves, most of them dropped in the summer. He sold them at an average weight of 400 pounds—a total of 28,600 pounds.

Young Sprowls was not satisfied with either the rate of production or the condition of his grass. He dissected his situation with Fred Whittington, a top-drawer range conservationist at Elk City. Fred and Bob worked out a conservation plan. It was important to balance

Note.—The author is range conservationist, Soil Conservation Service, Ardmore, Okla.

Left, overgrazed; right, mowed once and deferred from grazing for one year.

the livestock number with the available grass, and leave enough growth on the grass to build up the range—as Fred put it, simply "take half and leave half."

Bob started his new program by culling his herd and selling 48 head of cows. Then he seeded 100 acres of formerly cultivated land to native grass. One big pasture was cross-fenced into three smaller pastures to make better management possible. One pasture was rested through the growing season for winter use, and 350 tons of silage were put up from the cultivated land. He penned his bulls to regulate calving dates.

Results came the very first year. Young Sprowls sold 2,600 more pounds of beef than he had the year before. The calf crop increased from 44 percent to 65 percent. The average cow was 260 pounds, as against 170 in 1952. This was done with the same amount of hay plus 170 tons of silage. At the same time, he reduced the protein supplement from 25 tons to 3 tons.

After this experience, Bob sold 20 more cows, leaving a herd of 100. In 1954 he sold 34,040 pounds of calves. He produced an 80 percent calf crop, with an average of 340 pounds per cow. Profits have gone up even more than production. Feed bills are down, and so are operating expenses, interest, and taxes.

The grass? Fred Whittington reports a very definite improvement in spite of drought conditions. Rain gages near the ranch recorded 13.32 inches of rain in 1952, 16.8 inches in 1953, and 20.09 inches in 1954. This is in contrast with an average of nearly 22 inches per year.

Conservation ranching is paying off for Bob Sprowls, but the benefits don't stop there. He is doing his part in the land treatment program carried on by his Upper Washita Soil Conservation District. This is a very important part of the upstream flood control program being established on the Washita River watershed. The biggest reservoirs are in the soil itself.

Conservation ranching keeps the soil in condition to absorb large quantities of water, thereby helping to reduce floods. To illustrate, tests were made near Ardmore, Okla., in August 1951. A fence-line contrast on a typical prairie upland range site was selected. One side of the fence was well managed, moderately grazed range in excellent condition—a part of the Daube's IS Ranch, cooperators with the Arbuckle Soil Conservation District.

The other side of the fence was overgrazed, range in poor condition, a pasture rented out a year at a time with no grazing restrictions. A concentric ring infiltrometer was used to determine the infiltration rates on the two condi-

tions. In a 2-hour test, the excellent condition range took up 10 inches of water compared with 4 inches on the poor condition range.

After the first 15-minute period, the excellent range continued to take up one or more inches of water each 15 minutes while the poor range gradually took water at a slower rate, finally dropping to only one-fourth the rate of other's intake. Under natural rainfall, there would have been yet more contrast as the force of raindrops would churn the soil and seal the surface on the poor range.

Thermometers were used to measure the effect of range cover on soil temperature. The test was made under a cloudless sky with the air temperature at 105° F. The soil temperature was 95° F, under a cover of excellent condition and 135° F under poor condition. There would be very little, if any, activity of beneficial soil organisms at the higher temperature and the evaporation would be much higher.

Clippings were made to measure the amount of ground cover. The excellent range had 5,500 pounds per acre of standing forage, including some from the previous year's growth. There were 2,000 pounds per acre of mulch or litter on the soil surface, making a total of 7,500 pounds per acre of protective cover. The poor range had 1,750 pounds per acre of vegetation, but no measurable amount of mulch or litter.

Studies made with ranchers in this area indicated that moderately grazed, excellent condition range similar to Daube's produces at least three times as much beef as overgrazed, poor condition range. Conservation ranching will increase the production of this poor condition range just as it did on the Bob Sprowls ranch.

Grass is the crop of the rancher and stockman whether sold as hay, beef, wool, milk, or mutton. Conservation ranching produces more grass.

Windbreak Strips Protect Watermelons

In Florida farmers are growing blue lupine and small grains to discourage sand blowing and to improve the soil.

By DAVID P. VENTULETT

WINDBREAK strips between watermelon beds have proved profitable to farmers in Central Florida, according to R. E. Word, chairman of the Sumter Soil Conservation District. The soil losses and damage to watermelon vines caused by March winds in this area have been cut to a minimum through the use of such windbreaks. Blue lupine is the plant principally used for this purpose but small grains such as rye and oats are also effective.

In 1954 Florida produced 23 percent of the Nation's entire watermelon crop. Peninsular Florida planted 65,300 acres, or 62.5 percent, of the State's crop. Practically all of this acreage was subjected to damage by early March winds.

Watermelons are usually planted on "new ground" to reduce the insect and disease hazards. Most of these "new ground" areas are composed of light sandy soils that are very susceptible to wind erosion. "Young melon vines are severely damaged by the cutting action of blowing sand and by being whipped about by the wind which knocks off the blossoms," Word says. "Although planting windbreak strips of blue lupine increases cost, the method does insure the setting of a crop of melons on the vines."

Inasmuch as a large percentage of watermelons is produced on "new ground," growers try to locate areas having as sparse a stand of trees as possible. This leads to the clearing of sandy blackjack oak ridges. These so-called ridges are usually undulating, composed of land

Note.—The author is area conservationist, Soil Conservation Service, Ocala, Fla.

Watermelon rows 12 feet apart with two rows of blue lupine in middle.

in Classes III, IV, and V which is very susceptible to wind erosion.

The field is bedded in 10- to 12-foot beds. Fertilizer is applied in a furrow down the middle of the bed about 30 days prior to planting the melon seed. The date of planting varies with each grower, depending on his guess as to the last killing frost. The race is then on to ship the first carload of melons.

Windbreak strips are planted in late October or November, using one of two methods. The most popular is to drill two rows of blue lupine, with corn planters, between each two watermelon beds. The lupine rows are usually from 1 foot to 2 feet apart. The other method is to solid-plant the entire field to lupine. A few weeks before melon planting time the watermelon beds are plowed up, leaving strips of undisturbed lupine between beds. This method costs more but furnishes an excellent soil building crop for the melons.

Small grains, such as oats and rye, have been successfully used in the area for windbreaks. Rye, principally Florida black or abruzzi, has a slight edge over oats, as it grows taller, thus giving better protection. Many methods of planting the windbreak strips between the melon beds have been used, depending on the equipment the farmer has at hand. Most popular, however, is to drill two rows spaced about 1 foot apart between the melon beds with a corn planter, using plates adapted to the task.

It has been found that windbreak strips give the best protection from wind damage when they run east and west. The most damaging winds are from the southwest.

Farmers in the Sumter and Pasco Soil Conservation Districts are finding that land having Pensacola Bahia or Pangola grass sods that are 5 years or older will produce excellent watermelons. The strips pay off double, for after the watermelons are harvested and the land disced a better-than-ever grass pasture soon volunteers. On the better soils this practice fits in nicely with the grass based rotations that SCS technicians are recommending.

Planted solid to blue lupine in November; plowed in February into strips for protection of watermelons against wind damage. Lupine strips are about 4 feet wide with watermelon rows between.

On new-ground melon fields, the land is disced immediately after harvest and seeded to a mixture of Alyceclover and Pensacola Bahia grass. The clover is either harvested for seed or cut for hay. The Pensacola Bahia grass then takes over and furnishes high quality pasture.

"The windbreak strips of lupine, oats and rye, coupled with the use of sods in the crop rotation system, are enabling conservation farmers to protect their watermelon land in Central Florida," Word says. "These simple practices, with other conservation measures which are included in complete soil conservation plans, make it possible for farmers in our district largely to eliminate some of the risks in our farming operations. We no longer have to look at the dust clouds during the spring months with a feeling of hopelessness; the answer to a major problem has been found and is spreading rapidly to other farmers."

Leveling with a 13,000-pound cutaway disc pulled by tractor.

Deep Plowing to Fight the Wind

This method, on test in Missouri, brings up clay to anchor the sand and produce a soil structure resistant to blowing.

By GAYLORD H. WISNER

SIX years ago when Dunklin County, Mo., farmers established their soil conservation district, one of the major problems confronting them was wind erosion. Approximately one-third of the county was faced with this problem.

A number of practices to combat the problem, were introduced at suggestion of SCS technicians, among them wind stripcropping and adapted grasses and legumes. The latest practice is deep plowing—*as much as 40 inches*—for the purpose of turning over the sand and developing a better soil structure.

Thousands of acres in Dunklin and other counties in southeast Missouri and neighboring Arkansas, are confronted with the same problem. Fortunately, the sand layer is sufficiently shallow to be tied down by a clay layer brought up by deep plowing. Lack of uniformity in the subsoil here is the rule rather than the exception, but it appeared that in all cases a mixing operation with the very fine sandy topsoil would greatly improve the soil structure.

This last March Nelson B. Tinnin, chairman of the board of supervisors and a commissioner on the State Soil Districts Commission, succeeded in interesting a local equipment company in starting some deep plowing.

Tinnin, in cooperation with the company, test-plowed a 40-acre tract. This piece of land will be watched closely during the next few years.

Dunklin County is cotton country and its sandy soils, where blowing can be controlled, are capable of producing a bale to the acre. With this new practice and with proper use of fertilizers it is believed that even this good yield can be materially bettered.

Note.—The author is work unit conservationist, Soil Conservation Service, Kennett, Mo.

Plow in action on Nelson B. Tinnin farm southwest of Hornersville in Dunklin County, Mo.

Immediately after plowing to average depth of 40 inches, and before leveling. The field was gridded at 100-foot intervals and borings taken on the grids.

DISTRICT PROFILE	ADAM F. WYSOCKI of NORTH DAKOTA

GOOD conservation management has transformed land that was nearly worthless 15 years ago into a profitable farm enterprise for Adam Wysocki, of Walsh County, N. Dak. Wysocki is one of the founders of the Three Rivers Soil Conservation District.

He acquired 280 acres south of Minto in 1941. Since then Wysocki has gone on to produce consistently high yields of wheat and sugar beets, and his tall wheatgrass took first honors at the North Dakota winter show in Valley City, first at the State Potato Show, and second at the International Grain and Livestock Exposition at Chicago in 1954.

There was a large salt "flat" on the Wysocki farm that wouldn't even grow saltgrass. Another area had dense brush. There was crying need for land management practices.

Adam Wysocki helped to launch the Three Rivers District, which takes in the 16 eastern townships in Walsh County. He was elected a district supervisor and became chairman at the first meeting in 1943.

Originally, the farm included 153 acres of cropland. This has been expanded to 211 acres by clearing out trees, digging ditches, and using tall wheatgrass in combination with drainage systems to improve the salty soil areas so that salt-tolerant crops such as barley and beets could be grown.

The Wysocki farm is noted for its production of certified dryland grain and beets. It carries no livestock. Many times this Minto conservationist has cooperated with the North Dakota Agricultural College at Fargo to increase seed crops such as Carlton durum and Rival, Mida, Lee, and Selkirk wheat. In 1951 he produced certified foundation stock tall wheatgrass.

High quality grain and sugar beets come from the Wysocki farm. Its average sugar beet yield runs 12 tons per acre. Quite often it goes to 14 tons, and one year it went to 18 tons. The wheat harvest is 40 bushels to the acre; the highest yield obtained since soil practices were put into effect hit 46 bushels.

Adam Wysocki

In recognition of his exceptional soil conservation work, Adam Wysocki was elected a director of the North Dakota State Association of Soil Conservation Districts and last year was made president.

Since the disastrous floods of 1948 and 1950, Wysocki has been behind a move to get the Soil Conservation Service to survey the Forest River watershed area. He is a director for Walsh County on the Red River Watershed and Flood Control Association. He has worked with the corps of army engineers on surveys of flood damage along Forest River.

For many years, this farm leader was community committeeman for the AAA and its related price stabilization and conservation activities. He was a 4-H club leader for 10 years and served as treasurer of his rural school board. At present he is president of the Farmers Elevator Association at Minto, a position he has held since 1946; a director for Walsh County in the Red River Valley Beet Growers Association, and a director of the Minnesota-North Dakota Sugar Beet Development Association.

While his principal interests have continued to be in farming and crop yield improvement through soil conservation, Adam Wysocki has also found time, in recent years, to bring his talents to bear in urban affairs. He has been president of the Minto city council since 1942, and he has worked with others on water and

sewage projects and on establishing a fluorescent street lighting system.

Constantly alert for grasses or grains that will grow on salt-burdened land, Adam Wysocki in 1949 obtained 40 pounds of tall wheatgrass from the Soil Conservation Nursery at Mandan, N. Dak., and started a seed-increase plot. From this plot came certified foundation seed. Now, he supplies his neighbors with good seed from other plots in his conservation rotation system.

"Even the fertile lands of the Red River Valley need careful soil management if the tremendous production achievements of past years are to continue," Wysocki said not long ago. As to the nearly barren soil which he has transformed, he gives full credit to proper land management and conservation practices.

Adam Wysocki is a native of Walsh County in the heart of the Northern Red River Valley. He was born on a farm near Minto, in the area where he continues to make his home. He and his wife have three children. A son, Earl, operates a farm of his own nearby. Lorraine is married to a member of the United States Air Force, and another daughter, Judy, is a student in high school.

—GORDON L. BRACKETT

Out of the Desert, a Farm

By WILLIAM H. ATKINSON

It takes a lot of water for a thirsty land. Here's one glimpse of the large irrigation reservoir on the Hemler place.

HOWARD Hemler and family literally have carved a farm out of the desert. Using a conservation plan, good judgment, and hard work, in 20 years they developed a piece of creosote brushland into a highly productive farm.

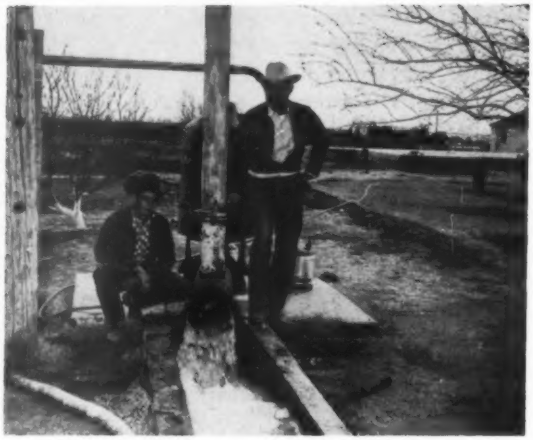
Howard came to Carlsbad, N. Mex., from Louisiana in 1920, with his father and mother. They settled in La Huerta. His father was a farmer and it was through him that Howard learned to appreciate the importance of taking care of the soil.

In 1935, with considerable ambition but very little cash, Howard bought his present farm, 4 miles south of Carlsbad. At the time the 240 acres were nothing but creosote brushland.

The first year, Howard put down a small well and planted 2 acres of cotton. In the thirties any start was a good start. "My rotation was sound: 2 acres of cotton and 238 acres of native grass," he said. He had employment at a potash mine, "To keep beans on the table."

The big turning point came in 1940. That year he drilled a well that pumps approximately 1,700 gallons of water per minute. It enabled

Note.—The author is work unit conservationist, Soil Conservation Service, Carlsbad, N. Mex.



Hemlers at irrigation well.

him to put most of his land under cultivation. But irrigating was not easy. Yields were low, water was wasted. In 1950, after the Carlsbad Soil Conservation District came along, prices improved, more labor was available, money was more plentiful. Howard signed as a district cooperator. With assistance of SCS technicians he got his conservation plan going. It included leveling land, laying out fields so that two fields could be watered from one ditch, eliminating other ditches and releasing land for the production of crops, permanent irrigation structures, concrete-lined ditches, soil improvement, and fertilizing. Within a year he had completely reorganized his irrigation system, leveled 200 acres, followed his soil improvement program, and put many conservation practices in effect. It was this year that Howard won the New Mexico Bankers Association Conservation Award for completing 90 percent of his conservation plan.

In 1952, he purchased more land, got 400 acres under irrigation. At last, after 20 years, he was able to stop working at the potash mines. His whole time was now taken up supervising his farm. The expanded farm has received the same conservation treatment as his original home place.

As of today, Howard has leveled 400 acres, installed 122 headgates and drop structures, purchased an adequate number of irrigation siphon tubes, concreted 4,100 feet of ditch, practiced crop rotation, and followed a soil-building program.

The main feature of Howard's conservation program is that it has paid its own way. Production has doubled and in many instances tripled. Fifteen to eighteen tons per acre of barnyard manure were applied to the cut areas which occur in land leveling. Commercial fertilizers were applied in sufficient amounts. Improved varieties of seed were planted. Dusts and sprays for insects and disease control were used. Land was leveled for the most efficient use of water. Correct amounts of water were applied, and at the proper time.

He also has increased his livestock program every year. "If I get nothing but the manure," he says, "I have made a profit on my animals." One hundred fourteen steers are being fed and a daily increasing number of hogs. Feed grown on the farm are being fed all of them, except for some meal and minerals. A bumper crop of grain sorghum is doing most of the job, with the help of a volunteer crop of barley which furnishes grazing all winter. The barley crop is another example of planning and not just a lucky break. After the winter barley was taken off, Howard disked the ground, so if a rain did come he would get some good grazing from a

Young Pardoe Hemler and dad beside pickup truck.

"Pretty good job of leveling, don't you think, son?"

volunteer crop. If it did not rain he had lost nothing—but it did rain.

Howard's achievements have not gone unnoticed. In 1951 he received the Bankers Award already noted. In 1954 he was elected to the Carlsbad Soil Conservation District Board of Supervisors, and in 1954 also he was chosen by the New Mexico Association of Soil Conservation District Supervisors as the best conservation farmer.

Explorers Mount Soil Profiles

SOIL and water conservation nowadays comes a lot easier to students in the Sanford, Maine, junior and senior high schools, thanks to Explorer Post No. 324, York County District, Pine Tree Council. When teachers asked them for help in explaining the fine points of "topsoil," "subsoil," "erosion" and similar matters, the boys-in-green found a way to expose such mysteries right in the classroom.

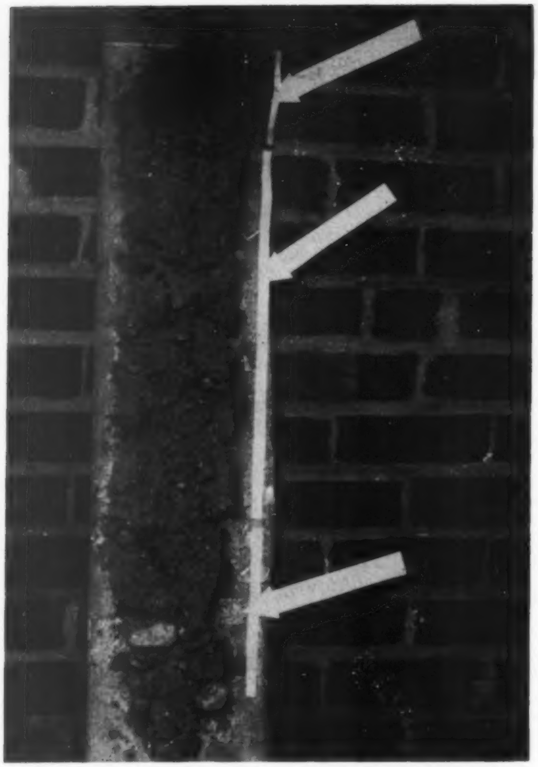
Here's how they mounted "soil profiles"—cross sections of earth—with the guidance of Sheldon Michaels, post adviser. The latter is a surveyor for the U. S. Soil Conservation Service.

First, the boys assembled the following materials:

1 piece 36 inch x 4 inch pressboard
1 piece 36 inch x 4 inch canvas
1 gallon clear acetate airplane dope
1 gallon dope thinner
1 2-inch paintbrush
1 1-inch paintbrush
1 garden spade
1 hunting knife

Explorers take look at soil profile.

Then, they hiked until they found a roadside cut-bank where raw earth was exposed. With the spade, they cut a fresh, flat, vertical face in the bank, slightly more than 3 feet deep and 4 inches wide. They used the 2-inch brush to saturate it with a half-gallon of dope and thinner, mixed half-and-half. When the soil-face



Monolith of Merrimac fine sandy loam mounted on presswood: topsoil, subsoil, and parent material.

dried, they applied the canvas strip—coated first with undiluted dope.

Freeing the profile from the bank proved to be ticklish. Knifing to a depth of about 2 inches around the canvas was fairly simple. But it took a couple of sad mistakes to show them that the final slicing should be upwards from the bottom. Otherwise the sample cracked to pieces.

The next step was to paint a liberal coating of undiluted dope on the pressboard and stick the canvas-mounted profile to it.

And finally they used the knife and the smaller brush to trim and smooth the profile down to the earth section securely held by the dope. With labels indicating the various, significant layers in the soil, and a screw eye installed in top edge of the board, the profile was all set to hang in the schoolroom.

The Sanford Explorers have a few extra hints to pass along in case your outfit wants to try this stunt: A full-size (8-foot x 4-foot) pressboard panel costs about $3, but suitable scraps are often available at school workshops, warehouses, and factory shipping rooms. Dope cost the Sanford Post $3.25 a gallon, and thinner, $2.50, at the local airport. This was plenty for two profiles. Model shops often sell smaller quantities. Surplus stores, upholsterers, and auto top shops are likely sources for canvas.

Cheap paintbrushes keep expenses down. Thinner readily cleans them of dope, and prevents them from stiffening during the various stages of the job.

There's a trick to that first step of applying dope-and-thinner to the soil. Splash or drip it on to start; when partly dry, it will make a better surface on which to brush.

Thorough drying of dope takes at least one hour. Since there are three applications in the above process, the Sanford Scouts used waiting periods to study wildlife borders, snoop around for erosion, and test soil samples with Michael's professional kit. And, of course, there was a bang-up campfire and cooking spree.

Success of the profiles gave another puff to the Explorers' reputation as red-hot conservationists. Their annual labors in planting thousands of trees throughout the York County Soil Conservation District long ago won the respect of grateful farmers.

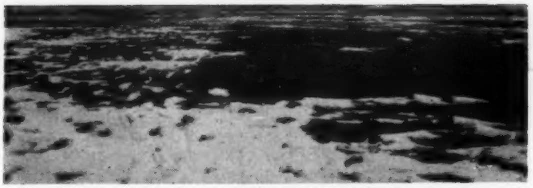
Range Pitting

By HARLAN N. TULLEY

PITTING of native pastures is proving to be a boon to grass production in the short grass areas of Wyoming. Where blue grama makes up most of the grass and western wheatgrass is present but not abundant, the operation encourages the wheatgrass to become a larger part of the forage. This leads to higher production per acre, since the taller wheatgrass will produce 4 to 5 times the amount of forage that can be gotten from the short grama grass under the same conditions.

Rhizomatous-rooted grasses like western wheatgrass respond quickly to pitting, since

Note.—The author is range conservationist, Soil Conservation Service, Sheridan, Wyo.



One effect of pitting blue grama rangeland in windy country. The snow is held, to melt in warm weather and replenish soil's moisture supply. Taller grasses then send their roots and seeds into the small bare places provided by the pits, and thus increase desirable grasses and multiply volume of forage.

the underground rootstalks grow into the pits, where conditions are right for sending up new plants. Bunch grasses do not react to pitting this way because they depend on seed to make new plants. Their response is more in the nature of increasing the size of plants already there, which in turn means more forage produced.

Pitting can be done at the rate of about 3 to 5 acres per hour depending on how rough the ground is. If there already is a fair cover of native grass it is better not to seed with the pitting, since the native grass will respond first and crowd out any seedlings that may survive from whatever is sown. Pitting can be done at any time the ground is not frozen. It is best to pit just prior to the time that general rainstorms can be expected. This will get the vegetation growing in the pits and lessen the possibility of wind erosion damage.

Pitting is a suitable practice on any rangeland with fair to good forage cover, moderate slopes, and deep loamy soils. It is there that the best results are obtained. It encourages the mid and tall rhizomatous-rooted grasses to increase on land where short grasses predominate. Pitting on shallow, steep, or sandy soils is not advisable because the beneficial effects of increased moisture penetration are limited by the character of soil or topography.

The pits will begin to slough in within 2 years, and in about 5 years they become almost invisible. The improved soil permeability to which they have contributed will continue to be effective much longer than that. And the increased plant growth and vigor will help to retain this desirable condition.

It is necessary to protect the pitted land from grazing during the first two growing seasons after treatment in order to get the best increase in new plants and in plant vigor. Fall and winter grazing, however, is not detrimental. Records on pitted land in Wyoming show that infiltration of rain and snow water on short grass range is increased about 50 percent, and the grazing capacity is increased about a third over land not pitted.

BETTER ROAD, FEWER MOSQUITOES!—The newly completed Mexican Field Drain near Los Banos, Calif., is a good example of happy results from cooperation. Twenty-five farmers, working closely with county, state, and federal agencies, improved 974 acres of good farmland by drainage, eliminated a severe mosquito menace, and saved farmers $4,000 of the cost.

The Mexican Field Road was in poor condition. The Merced County Board of Supervisors decided to abandon it unless landowners could keep drainage water out of the borrow pits.

To meet the double problem of saving the road and improving the drainage facilities, the farmers brought their problem to the Directors of the Los Banos Soil Conservation District. The latter, using the services of engineers of the Soil Conservation Service, developed a plan that would cost the farmers $7,000. It was then that the Merced County Road Department, the Merced County Mosquito Abatement District, and the Agricultural Stabilization Committee lent their assistance.

The result was that 3¼ miles of drainage ditches, 3½ feet deep, were dug for an outlay to farmers of $3,018, a saving through cooperation of $4,000.

Pleased with completion of Mexican Field Drain: Henry Armstrong, road department; Dale Burnett, Soil Conservation Service; Sylvester Cardoza, chairman of farmer group; Roy Gondolfi, contractor.

Yield Triples

By KEITH J. DAMPF

THREE bales of cotton to the acre, where one used to grow!

This is the result of a complete soil and water conservation program on the farm of Eddie Manthei, of Seven Rivers Community, near Artesia, N. Mex.

"Last year," says Manthei, "on leveled ground I had 20 acres of cotton following alfalfa that made 3 bales to the acre. On remaining 36 acres cotton produced at the rate of 2½ bales to the acre."

His conservation plan, worked out with the Central Valley Soil Conservation District, calls for consecutive years of cotton following alfalfa. Then the land is seeded back to alfalfa while another alfalfa field is plowed up and planted to cotton. The alfalfa is fertilized each year with 150 pounds of 45 percent phosphate.

There are 160 acres in the farm, 145 acres under irrigation. This year 51 acres are in cotton and the remaining 94 irrigated acres will be in alfalfa.

In 1950, Manthei had a hillside field impossible to irrigate. He asked SCS technicians for assistance. As a result, the 44-acre tract was leveled. Today, this land is making some of the best crops in the Seven Rivers area.

"I was almost at my wit's end before that hillside was cut down into benches," Manthei recalls. "Water started from the ditch and actually washed away a lot of topsoil while it was pouring down the hill to the low end of the field. The top part of the tract got little water below the surface, while the lower end became waterlogged."

Twenty-four more acres were leveled in 1951, and 7 acres this year. The remainder of the farm is very nearly level, but Manthei plans to have some leveling done on more acres anyhow.

No water is wasted. From the time it is pumped from the ground until it is soaked up by the land, the water is under perfect control.

The high yield of cotton results from a complete conservation program, which includes land leveling, proper application of water, rotation, and fertilization.

Note.—The author is work unit conservationist, Soil Conservation Service, Artesia, N. Mex.

Manthei has one hand on bench leveling, one on border, to show height of border.

Ranchers Go to School

By THOMAS E. MULLINGS

RANCHERS of northeastern Colorado are going to "grass schools" to learn how to improve the management of their ranges. The idea started with Kenneth Conrad, who ranches in the sandhills northwest of Wray.

Conrad had been carrying on a range improvement program on his own ranch for several years, in cooperation with the Northeast Yuma County Soil Conservation District of which he is a supervisor. And he recently had attended a training session conducted by the Soil Conservation Service.

The schools developed as a cooperative enterprise of the Soil Conservation Service, the Extension Service, and the soil conservation dis-

Note.—The author is work unit conservationist, Soil Conservation Service, Wray, Colo.

tricts in Yuma County. The First National Bank of Wray helped stir interest, and the county agent helped with organization and promotion.

Since many ranchers found it difficult to meet for more than a day, it was decided to hold a series of night meetings at the centrally located Eckley High School. Articles appeared in newspapers. Post cards went to ranchers inviting them to attend. The school was set up to run 5 weeks with each session taking 2 hours. Instruction was handled by Soil Conservation Service and Extension Service.

Identification of native grasses came first. Growth characteristics, grazing, and indicator value of each grass were discussed, followed by a consideration of its adaptation to various soils, and the characteristic vegetation of local range sites in excellent, good, fair, and poor conditions.

Later, attention was given to the relationship between roots and top growth, and to the influence on growth of the degree and season of grazing. The importance of plant vigor and ground litter was stressed from the standpoint of forage production, as well as their bearing on runoff and erosion control.

The use of key species in determining proper utilization and the value of occasional deferment and seasonal adjustments of pastures was brought out. One session was devoted to grass seeding. Mechanical treatment of rangeland also was covered. Forage and beef production as related to range condition—the dollars and cents angle which vitally affects every rancher —was the main topic at the concluding meeting.

The instruction was handled by Thomas E. Mullings, SCS work unit conservationist with the Northeast Yuma Soil Conservation District. He was assisted by William Chandler, county agent, and Conrad, the rancher. George E. Bailey, work unit conservationist with the Hale Soil Conservation District, spoke on grass seeding. Ranchers and farmers participated freely. Several good ideas emerged out of the experiences of ranchers in meeting certain vexatious problems on their range.

Typical sandhill range in Colorado.

Attendance ran from 40 to as high as 75—significant, in view of the long distances that many ranchers had to drive. The attendance represented a good cross section of Yuma County; some came from as far away as Nebraska and Kansas. Interest now is developing in holding similar schools in other portions of Colorado and in Nebraska.

While it is recognized that programs of this type are not substitutes for on-the-ranch technical assistance, it is felt that they are valuable in putting across some of the general principles that have wide applicability. Possibly their greatest usefulness is in whetting interest in the need and worth of good range management.

SPECIAL RECOGNITION.— Gaylord H. Wisner has received a Community Service Award from the Kennett, Mo. Chamber of Commerce. As work unit conservationist, Wisner heads a staff of local Soil Conservation

Jack Stapleton, Jr., chamber president, presents award.

workers which has been cited frequently for outstanding accomplishment. The Dunklin County Soil Conservation District won in the 1954 Goodyear Conservation Awards Program and in 1953 was area winner of the St. Louis Globe-Democrat Soil Conservation District Awards Program.

The Kennett Chamber of Commerce inaugurated a radio program known as "Man on the Farm," the object of which is to raise individual farm income at least $500 annually in their trade territory.

REVIEWS

LA CONSERVACION DEL SUELO—PROBLEMA NACIONAL. (The Conservation of the Soil—A National Problem. By Carlos Roquero de Laburu. 32 pp. Illustrated. 1954 Spain: Ministerio de Agricultura, Direccion General de Coordinacion, Credito y Capacitacion Agraria.

IN reading this publication, one is reminded of USDA Circular No. 33, "Soil Erosion A National Menace," by Bennett and Chapline which was published in 1928. My impression, based on a brief visit to the country, is that the soil conservation program in Spain now is in much the same position that ours was in 1928, at least as far as the agricultural land is concerned.

This publication is written in an easy, familiar style. Many of the points are brought out in question and answer form. It is well illustrated and contains two photographs by the Soil Conservation Service showing contour farming. One of these photographs formed the basis of the colored drawing which is on the front cover.

The seriousness of the erosion problem is pointed out and the fact is emphasized that once the soil is washed away it is gone forever. Then, various methods of controlling erosion are discussed. Much of this material is very familiar to us. However, I am sure that it will be very helpful and instructive to the Spanish farmers.

One problem in Spain, as in many of the European countries where the land has been cultivated for thousands of years, is the extreme division of the land into small parcels. We have not had to contend with this in this country. For the most part, the parcels are long and narrow, running up and down hill because the land at the foot of the slope is usually better than that farther up and none of the heirs wishes to take the poorer land. The strips have become so narrow that it is impossible to cultivate them except up and down the slope, which further aggravates the problem. A law was passed in 1952 which prohibits further division of the land but there is still a very difficult problem of dealing with the situation that exists. For example, the author showed me a map of the holdings of one man who owned about 250 parcels with a total area of only 46 acres.

This publication does not attempt to go into the subject of land classification. Dr. D. S. Hubbell, who was in the research work of the Soil Conservation Service for many years, was in Spain last summer and helped lay the groundwork for a land classification system suitable to the needs of the country. This is necessary in order that the conservation measures be tailored to fit the needs of the land.

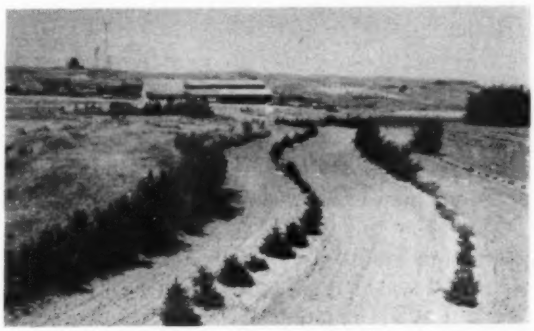
—HOWARD E. MIDDLETON

CAN BE PURCHASED.—Farmers, district supervisors, and others are welcome to subscribe to SOIL CONSERVATION Magazine. Price is $1.25 per year. (See inside of front cover.)

TREES AGAINST THE WIND.—In 1947 H. B. Ross, 25 miles east of Jordan, Mont, planted 3 rows of trees on contour terraces. The layout of his farmstead made it impractical to have these plantings where they would serve as a windbreak for his buildings so he planted them there where they could be watered from a storage dam and used to protect his garden.

He also planted about 1,000 cottonwoods and willows along the high water line of a series of small ponds near the house. He has since supplemented both plantings and has had excellent survival in all. The contour plantings have at all times been cultivated, hoed, and pruned but the cottonwoods required hoeing only the first 2 years. A 4-inch pipe provides supplemental water when needed. There are at present about 5 acres in these plantings and Ross plans to plant another 5 acres in the near future.

About 100 bushels of wild and hybrid plums were harvested in 1954. Orioles, goldfinch, thrush, and other birds not usually included in our prairie birdlife are annual nesters here.



Contour windbreak in 1951: left to right—plum, ponderosa pine, blue spruce.

Jack and Margaret Ross playing in cottonwood grove. Sage chickens nest here, as well as pheasants and Hungarian partridges.

Farmers study soil profile. They consider ease with which land can be stirred, whether or not it will take water readily, how tough is the subsoil, the depth and richness of the soil, the extent of erosion, and what conservation practices should be applied.

LAND JUDGING APPLIED.—Farmers and ranchers are beginning to put the knowledge they are gaining through land judging to work on their own farms, says Edd Roberts, Extension soil conservationist, Oklahoma Agricultural and Mechanical College.

He cites Don Stapleton, of Cordell, Okla., as an example. Stapleton states that he did not realize what was meant by using land according to its capability until he attended the first land judging school held in Washita County. He now has shifted several acres from cultivated land to grassland farming, and is cooperating in the soil conservation district program.

Roberts also reports Eldred Sasseen, of Dill City, Okla., as another farmer who has gained valuable experience from the land judging events and as a result is doing a better job of conserving his land. Sasseen is chairman of his local soil conservation district board.

According to Roberts, land judging contests have been held in all counties in Oklahoma. Dates for the National Land Judging Contest, sponsored by WKY and WKY-TV of Oklahoma City are April 28, 29, 30.

REPORT FROM INDONESIA.—About 30 percent of the Java forest has been removed in the last 15 years, leaving the land open to floods and soil erosion, according to George Bowers, soil conservation specialist. The Land Utilization Bureau and other Ministry of Agriculture agencies are taking steps to apply erosion control and correct land use practices.

Bowers is working with the bureau under the Foreign Operations Administration technical cooperation program. He explains: "Population in Indonesia, as in many other countries in the world, is increasing at a very rapid rate. In order to grow more food, people are cutting the trees from the steep land that only a few years ago was in a good protective forest. In many areas they are also removing perennial crops such as tea, coffee, and rubber that provided good protection to the land."

HISTORICAL NOTE.—This July issue of SOIL CONSERVATION Magazine completes 20 years of continuous publication. The same editor has served throughout.

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Water Reclaims Seep Land

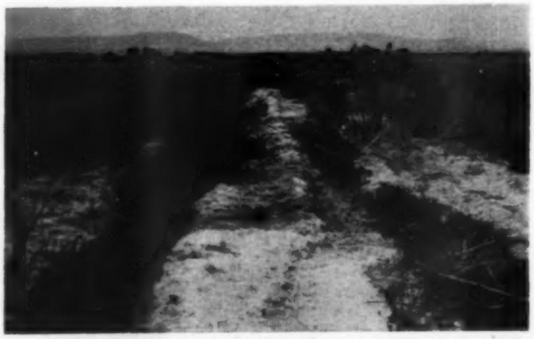
By ROBERT L. TRESLER

"HOW else can you reclaim seep land, except with water and the right kind of grass?" asked Reed Thomas. This was in answer to another question: "Why do you irrigate your new seedlings of tall wheatgrass so much?"

Reed Thomas is in Wyoming's Shoshone Soil Conservation District. His fields of tall wheatgrass are convincing.

His farm forms the shore of a shallow salty lake about 3 miles south of Lovell. It had been a long time since the wet land had grown a really good crop. But in 1952 Reed planted a small acreage of wet salty land to tall wheatgrass, using seed from seed plots established on neighboring farms. That first year he had to part the foxtail and the seepweed to find the grass. This year, however, tall wheat is dominating the field. Thomas was so enthused that last spring he plowed even saltier land, next to the lake. He seeded tall wheatgrass and started irrigating often and lightly, using corrugations. By August he had irrigated eight times and had a beautiful stand.

Tall wheatgrass is a surprising plant. It seems to grow as well on wet, salty land as on what is usually considered good land. It will grow where there is so much salt that other crops die. Even though it grows tall and rather coarse, it is a most usable grass. It is even pre-



Portion of field in June 1953; salt on surface, unstable soil, weeds dominant.

Same field late in August. Tall wheatgrass has done its job.

ferred by livestock to other pasture grasses at certain times of the year. Cut at an early stage, it makes good hay.

Light, frequent irrigations are one of the secrets. Even though there is a very high water table, it still is necessary to irrigate to dilute the salts and prevent the forming of a crust. It is also essential to prepare a good seedbed, by killing out the present vegetation and disking it down firmly. Almost all salty fields are dry enough sometime during the year to do this. The time of seeding is not so important as that a good seedbed be prepared and the seedlings irrigated often.

Note.—The author is agronomy specialist, Soil Conservation Service, Douglas, Wyo.

SOIL CONSERVATION

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